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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

TACHIWANA — Atty. Ref.: 330-237; Confirmation No. 9024

Appl. No. 09/863,263 — Group: 1755

Filed: May 24, 2001 — Examiner: Bolden

For: OPTICAL GLASS AND PROCESS FOR THE PRODUCTION OF OPTICAL PRODUCTS

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

EVIDENTIARY DECLARATION UNDER 37 C.F.R. §1.132

I, Kazuo TACHIWANA, a citizen of Japan, hereby state as follows:

1. That I am the inventor of the above-identified application, I graduated from Tokyo Science University with a degree in bachelor and am employed by HOYA Corporation, the assignee of this application.

2. I am familiar with the Official Actions of August 28, 2002 and May 13, 2003 and the documents cited in these Actions, including Komorita et al JP 53-4023 and Takahashi et al JP 54-90218.

3. That by training and experience I have investigated glass compositions for at least 17 years, including inorganic oxide glasses, the general subject of the above-identified patent application as well as uses of the glass compositions.

U.S. patents of which I am an inventor or co-inventor are listed below.

No.	US Patent Number	Title of Invention
1	4996173	Optical glass
2	5668066	Near infrared absorption filter glass
3	5972460	Information recording medium
4	6156684	Light polarization control element using stress-optical coefficient glass and method of producing the stress-optical coefficient

4. That based upon my personal experience and observation the metal oxides constituting the oxide glasses are limited, the number of kinds of such metal oxides being about 20 at most, so to produce oxide glasses capable of satisfying various desired properties it is necessary to select from this limited list of metal oxides.

In the oxide glasses composed of various of these available metal oxides, the total amount of the metal oxides is naturally limited to 100 %, thus when one attempts to add a predetermined amount of a certain metal oxide to attain a desired property, the other existing (one or more) metal oxide(s) used to provide other property (properties) is (are) decreased in a corresponding amount to maintain the total at 100%. In this case, it is entirely possible the entire glass composition becomes unbalanced, and no glass having intended properties can be obtained. Further, if one attempts to decrease a certain metal oxide by a predetermined amount, one or more existing metal oxide(s) inevitably increase(s) by an amount equivalent to the amount decreased. In this case as well, the entire glass composition is often unbalanced, and frequently no glass having intended properties can be obtained.

Due to these practical constraints, it is general practice for those skilled in this art concerned with the production of glass to select or reduce specific metal oxides from limited kinds of metal oxides, depending upon the types of oxide glasses desired, and prepare a number of compositions, make trials and errors by rely on their experiences of many years and use their experience and intuition for obtaining a glass

that satisfies various properties required in each case. Eventually, a suitable glass composition possessing the desired characteristics is found if their investigation is successful. Inventions relating to glass compositions, including the present invention, have difficulties after considerable effort for these reasons.

5. I understand that various claims of my application have been denied on the basis that one skilled in this art would or could easily exchange one or more of the metal oxides in a particular composition with another metal oxide, and a desired result will be reliably obtained. My experience indicates this is not the case.

6. I have prepared a glass composition (identified as "potential glass composition of Komorita et al" hereinafter) based upon the glass composition of the Komorita et al JP patent. The potential glass composition of Komorita et al was the same as the glass composition in Example 6 of my application except that part (5.0 % by weight) of La_2O_3 whose content was the largest (41.8 % by weight) in the glass composition in Example 6 was replaced with HfO_2. After the replacement, the potential glass composition of Komorita et al still fully satisfied the compositional requirements of my invention, except for the presence of HfO_2. I attempted to melt the potential glass composition of Komorita et al to form a glass and measure the glass for a refractive index (nd), an Abbe's number (vd) and a glass transition temperature (Tg). Table attached hereto shows the potential glass composition of Komorita et al containing 5 % by weight of HfO_2 together with the glass composition in Example 6 of the present specification.

However, when I attempted to form the potential glass composition of Komorita et al into a glass according to the procedures shown in the attached Table, it became devitrified during stirring, so I was not able to prepare the intended glass, and it was impossible to measure nd, vd and Tg.

7. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

By Kazuo Tachiwana
Kazuo TACHIWANA

Date: November 10, 2003

Table

	Glass composition of the present invention					Potential glass composition of Komorita et al
	Claim 23	Claim 24	Claim 25	Claim 26	Ex. 6	Ex. 6 (Part of HfO_2) replaced
SiO_2	6-9	6-9	6-9	6-9	6.7	6.7
B_2O_3	9-12	9-12	9-12	9-12	10.8	10.8
GeO_2	0-5	0-5	0-5	0-5	0	0
ZnO	0-15	0-15	1-7	1-7	4.5	4.5
La_2O_3	30-60	30-60	30-60	30-60	41.8	36.8
Gd_2O_3	0-30	0-30	0-30	0-30	9.6	9.6
Y_2O_3	0-10	0-10	0-10	0-10	3.8	3.8
Yb_2O_3	0-5	0-5	0-5	0-5	0	0
ZrO_2	2-8	2-8	2-8	2-8	5.2	5.2
Ta_2O_5	13-19	13-19	13-19	13-19	15.9	15.9
$SiO_2+B_2O_3+GeO_2$	16-19	16-19	16-19	16-19	17.5	17.5
B_2O_3+ZnO	9 or more	9 or more	12 or more	12 or more	15.3	15.3
$La_2O_3+Gd_2O_3+Y_2O_3+Yb_2O_3$	50-60	50-60	50-60	50-60	55.2	50.2
Total of the above components	95 or more	95 or more	95 or more	95 or more	98.3	98.3
Li_2O	0-3	0-3	0-3	0 - 3	0.2	0.2
$ZnO/(SiO_2+B_2O_3)$	0< -2	0< -2	-	-	0.26	0.26
$(La_2O_3+Gd_2O_3+Y_2O_3+Yb_2O_3)/(SiO_2+B_2O_3)$	2-4	2-4	-	-	3.15	2.87
$(ZrO_2+Ta_2O_5+Nb_2O_5)/(SiO_2+B_2O_3)$	1-2	1-2	-	-	1.28	1.28
Nb_2O_5	0-3	0.5-1.5	0-3	0.5-1.5	1.3	1.3
WO_3	0-1	-	0-1	-	0	0
Sb_2O_3	-	-	-	-	0.2	0.2
HfO_2	-	-	-	-	0	5
Total					100.0	100.0
Reproduction state					Glass formed	Devitrified during stirring
nd (Sp)*	1.875≤	1.875≤	1.875≤	1.875≤	1.88	-
nd (found)	-	-	-	-	1.88024	Unmeasurable*
νd (SP)*	39.5≤	39.5≤	39.5≤	39.5≤	40.9	-
νd (found)	-	-	-	-	40.99	Unmeasurable*
Tg(°C) (SP)*	700°C≥	700°C≥	700°C≥	700°C≥	672	-
Tg(°C) (found)	-				684.3	678
Method of glass production					Method**	

(Sp)* = Value in specification, Unmeasurable* = Unmeasurable due to devitrification, Method* = Powders as raw materials were fully mixed and then placed in platinum crucible. The Powders were melted in a furnace at 1,400°C, stirred and clarified, and then a molten glass was cast into a molding frame made of iron under heat at a proper temperature and held at a temperature near Tg for 2 hours and gradually cooled.